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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/731,995	12/09/2003	Todd O. Bolken	6047-67518	5870

7590 04/18/2005

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EXAMINER


GEYER, SCOTT B

ART UNIT PAPER NUMBER

2812

DATE MAILED: 04/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 10/731,995	Applicant(s) BOLKEN ET AL.	
	Examiner Scott B. Geyer	Art Unit 2812	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 09 March 2005.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 40-46, 49 and 56-59 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 40, 42-46, 49 and 56-59 is/are rejected.
- 7) ☒ Claim(s) 41 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 December 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

Applicant note: the examiner for this patent application has changed since the last office action (mailing date 2-23-05).

### *Drawings*

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: **for example, figure 4, numerals 406, 411, 413**. *Applicant should check all drawings and the specification so as to fix any other problems.* Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

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***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 49 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 49, lines 1-2 recite "mold for molding a package for at least one die bonded to a substrate".

Claim 49, lines 6-7 recite "first mold portion and second mold portion define package covers and ribs for a plurality of die bonded to one of more substrates".

The claim initially recites at least one die (meaning 1 or more) to a substrate (only 1 substrate). Then the claim recites a plurality of die (meaning 2 or more) to one or more substrates (1 or more). The recitation of lines 6-7 contradicts and changes what is initially stated in lines 1-2. For purposes of examination, the examiner will interpret the claim to mean a mold for molding at least one die to at least one substrate (which is similar to claim 40).

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the

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applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 40, 42-46, 49 and 56-59 are rejected under 35 U.S.C. 102(e) as being anticipated by Weber (6,038,136).

As to **claim 40**, Weber teaches a mold for molding a package in figure 6, wherein the mold has a first mold portion (i.e. a top portion) 32 and a second mold portion (i.e. a bottom mold portion) 34. The mold is used for encapsulating a die 12 bonded to a substrate 14. The top mold portion 32 defines a cavity for encapsulating the die 12 and substrate 14. The bottom mold portion 34 has a rib, which has a thickness which is at least as great as the solder balls 24. The rib projects outwardly from the surface of the substrate opposite the surface to which the die is bonded (see figure 6 below for more detail).

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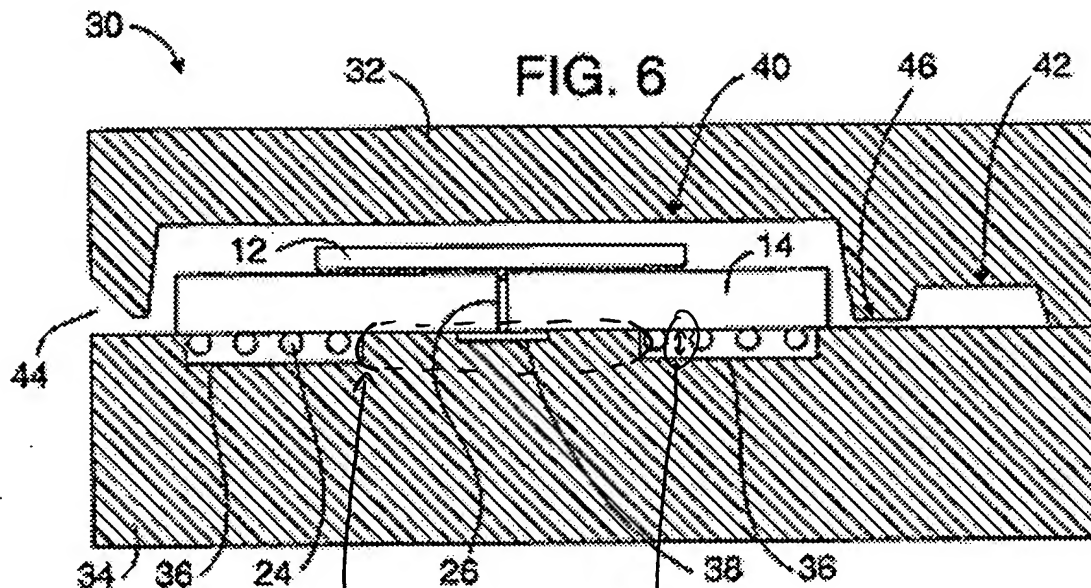
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(see drawing on next page)



*rib area,  
which extends from  
the substrate.*

*thickness of rib area is at least  
the thickness of the solder bumps.*

As to **claim 42**, Weber teaches the top mold portion, and the bottom mold portion, configured to encapsulate at least a portion of the surface of the substrate 14 opposite the surface to which the die is bonded (see figure 7 and 8, numerals 38 and 48).

As to **claim 43**, Weber teaches the top and bottom mold portions contact each other.

As to **claims 44 and 45**, Weber teaches the top and bottom mold portions are configured to encapsulate at least a portion of the substrate edges (see figure 7 and 8).

As to **claim 46**, Weber teaches the top and bottom mold portions contact each other.

As to **claim 49**, Weber teaches a mold for molding a package in figure 6, wherein the mold has a first mold portion (i.e. a top portion) 32 and a second mold portion (i.e. a bottom mold portion) 34. The mold is used for encapsulating a die 12 bonded to a substrate 14, and at least a perimeter of the surface of the substrate to which the die is bonded. The top mold portion 32 defines a cavity for encapsulating the die 12 and substrate 14. The bottom mold portion 34 has a rib, which has a thickness which is at least as great as the solder balls 24. The rib projects outwardly from the surface of the substrate opposite the surface to which the die is bonded (see figure 6 above for more detail).

As to **claim 56**, Weber teaches a mold for molding a package in figure 6, wherein the mold has a first mold portion (i.e. a top portion) 32 and a second mold portion (i.e. a bottom mold portion) 34. The mold is used for encapsulating a die 12 bonded to a substrate 14. The top mold portion 32 defines a cavity for encapsulating the die 12 and substrate 14. The bottom mold portion 34 has a rib, which has a thickness which is at least as great as the solder balls 24. The rib projects outwardly from the surface of the substrate opposite the surface to which the die is bonded (see figure 6 below for more detail).

As to **claim 57**, Weber teaches the top and bottom mold portions contact each other.

As to **claims 58 and 59**, Weber teaches the top and bottom mold portions are configured to encapsulate at least a portion of the substrate edge.

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***Allowable Subject Matter***

Claim 41 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. As to claim 41, the prior art of record and to the examiner's knowledge does not teach or render obvious, at least to the skilled artisan, the instant invention regarding a first and second mold portion which define package covers and ribs for a plurality of die bonded to a substrate.

***Response to Arguments***

Applicant's arguments filed March 9, 2005 have been fully considered but they are not persuasive. As to independent claims 40 and 49: the applicant argues that Weber does not teach or suggest a second mold portion that defines a rib. However, as shown with the assistance of the included drawing above, Weber does teach a second (i.e. bottom) mold portion that defines a rib. Further, although claim 40 does recite the mold is used for "molding a package for at least one die bonded to a substrate", the claim is in fact a mold apparatus claim, and not an 'encapsulated semiconductor device claim'. Therefore, the arguments to whether the completed device show by Weber are similar to that of the completed device that may be made by the applicant's mold are not relevant.

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***Conclusion***

The following references are cited as being particularly related to the applicant's invention: Orcutt (6,187,612 B1) and Takahashi et al. (5,766,972).

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Scott B. Geyer whose telephone number is (571) 272-1958. The examiner can normally be reached on weekdays, between 10:00am - 6:30pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Lebentritt can be reached on (571) 272-1873. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR.


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Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

 4-14-05

Scott B. Geyer  
Patent Examiner, 2812  
April 14, 2005



**HA NGUYEN**  
**PRIMARY EXAMINER**